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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HARPER, HOLLY R	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 07/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/926,494	SAMUEL ET AL.
	Examiner	Art Unit
	Holly R. Harper	2879

-- The MAILING DATE of this communication appears on th cov r sh t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) 30-32 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 02/11/2002 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

The Amendment, filed on 11/13/2001, has been entered and acknowledged by the Examiner.

Claims 3-6, 8-14, 17, 18, 20, 22, and 24-28 have been amended.

Claims 31 and 32 have been cancelled.

Specification

1. The disclosure is objected to because of the following informalities: headings are missing from the sections of the Specifications. For example: Background of the invention, brief summary of the invention, brief description of the drawings, etc. Appropriate correction is required.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, as specified in claim 7, the microstructure structure with different regions of periodicity must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 23 provides for the use of a semi-conducting organic or organometallic layer with lateral microstructure in an LED, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

6. Claim 24 provides for the use of an LED, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claim 23 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35

U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

9. Claim 24 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-17, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al. (WO 98/25313).

In regard to claim 1, the Barnes reference discloses an LED (Figure 5 and Page 8, Lines 3-7) with a semiconductor layer (Figure 5, Element 55) and a periodic microstructured feature (Figure 5, Element 53). Because the LED has a sequence of layers on a substrate (Figure 5), the LED must have two electrodes, one adapted for electron injection and one adapted for hole injection, sandwiching the layer structure.

The recitation "adapted to manipulate emission and/or propagation of light by coupling non-radiative waveguide-modes to far-field radiation" has not been given patentable weight because is considered an intended used recitation. It has been held that

a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 2, the recitation "configured to increase efficiency of emission by facilitating the coupling, at least in part to useful far-field radiation so recovering some of the energy that would otherwise have been lost to non-radiative waveguide-modes" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 3, the recitation "microstructured features is adapted to modify the intensity, polarization, or spectrum of emitted light" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 4, the Barnes reference discloses that the microstructured feature is generally lateral and parallel to the semi-conductor layer (Figure 5).

In regard to claim 5, the recitation "specifically configured to control the polarization state of emitted radiation" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not

differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 6, the recitation "adapted to control the frequency of radiation emitted in a given direction" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.
In regard to claim 7, the Barnes reference discloses an LED with a periodic microstructured feature, but it does not disclose many regions of different periodicity. However, it is noted that the inclusion of different regions of periodicity is not shown to solve any problems or yield any unexpected results that are not within the scope of Barnes's LED. Accordingly, the inclusion of different regions of periodicity is considered to be an obvious matter of design choice.

In regard to claim 8, the recitation "configured in conjunction with the photonic band-structure of the LED to allow for the preferential excitation of one or more desired wave guide modes" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 9, the Barnes reference discloses an LED with a microstructured feature, but it does not specify the microscopic scale. However, it is noted that the determination of such a scale is not shown to solve any problems or yield any unexpected results that are not within the scope of Barnes's LED. Accordingly, the

determination of such the microscopic scale is considered to be an obvious matter of design choice and could be determined by one skilled in the art through experimentation.

In regard to claim 10, the Barnes reference discloses that an LED has a light (radiation) emitting substance usually in the form of a thin film (Page 1, Lines 5-6)

In regard to claim 11, the Barnes reference discloses that the microstrcutured feature is solid and the layer is continuous (Figure 5).

In regard to claim 12, the Barnes reference discloses that the microstructred feature provides the entirety of the microstructured layer (Figure 5).

In regard to claim 13, the recitation "acts as a diffraction grating" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 14, the Barnes reference discloses that the microstructured feature is made of an array of opposed projecting portions (Figure 5).

In regard to claims 15 and 16, the Barnes reference discloses an LED with a microstructured feature, but it does not specify the depth between the peaks and troughs. However, it is noted that the determination of such a depth is not shown to solve any problems or yield any unexpected results that are not within the scope of Barnes's LED. Accordingly, the determination of such the depth between the peaks and troughs is considered to be an obvious matter of design choice and could be determined by one skilled in the art through experimentation.

In regard to claim 17, the Barnes reference discloses that the corrugation is in the entirety of the layer (Figure 5).

In regard to claim 20, the Barnes reference discloses the use of a light emitting layer but does not specify the material. It is well known in the art to use an organic material for the luminescent layer of an LED.

In regard to claim 21, the Barnes reference discloses that the light emitting layer is a conjugated polymeric material (Figure 5).

In regard to claim 22, the Barnes reference discloses the use of a light emitting layer but does not specify the material. It is well known in the art to use an inorganic material for the luminescent layer of an LED.

In regard to claim 25, the Barnes reference discloses the method for production of an LED, where a laminar structure is fabricated comprising one or more semiconductor layers and a periodic microstructured feature adapted to manipulate emission or propagation of light (Figure 5 and Page 2, Lines 21-25). Because the LED has a sequence of layers on a substrate (Figure 5), the LED must have two electrodes, one adapted for electron injection and one adapted for hole injection, sandwiching the layer structure.

In regard to claim 26, the Barnes reference discloses the use of a light emitting layer but does not specify the material. It is well known in the art to use an organic material for the luminescent layer of an LED. The semi-conducting layer has lateral periodic microstructured features of a suitable period to facilitate coupling.

The recitation "at least in some part to useful far-field radiation so recovering some of the energy that would otherwise have been lost to non-radiative waveguide-

modes" has not been given patentable weight because is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

In regard to claim 28, the Barnes reference discloses that the microstructured feature is produced by photo-lithography (Page 3, Lines 24-25).

In regard to claim 29, the Barnes reference discloses that an interferometer is used to fabricate the substrate (Page 4, Lines 7-9).

In regard to claim 30, the Barnes reference discloses that the microstructure is transferred from the photoresist layer to the substrate (Page 10, Lines 25-32).

12. Claims 1 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joannopoulos et al. (WO 98/25314).

In regard to claim 1, the Joannopoulos reference discloses an LED (Figures 6 and Page 13, Line 35- Page 14, Line 32) with a semiconductor layer (Figure 6, Element 620) and a periodic microstructured feature (Figure 6, Element 608). Because the LED has a sequence of layers on a substrate (Figure 6), the LED must have two electrodes, one adapted for electron injection and one adapted for hole injection, sandwiching the layer structure.

In regard to claim 18, the Joannopoulos reference discloses that the microstructured feature comprises areas of modified refractive index (Page 7, Lines 21-36).

In regard to claim 19, the Joannopoulos reference discloses that the portions of the layer with the modified refractive index are in the form of areas laterally across the layer (Figure 6 and Page 7, Line 21- Page 8, Line 10).

13. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barnes et al. (WO 98/25313) in view of Ueda et al. (USPN 6,060,826).

All the limitations of claims 25 and 26 have been met in the rejection under Barnes above.

In regard to claim 27, the Barnes reference discloses a semi-conducting layer but does not specify how the layer is coated. The Ueda reference teaches that the organic luminescent layer may be formed by spin-coating or dip-coating (Column 7, Lines 22-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the organic layer by spin-coating or dip-coating, as taught by Ueda.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Harper whose telephone number is (703) 305-7908. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Holly Harper
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